

# **The Atom Can Work For You!**

**Activation Analysis**

**Neutron Diffraction**

**Biomedical Research**

**Nondestructive Testing**

**Isotope Production**

**Weapon Effects**

**Forensics**

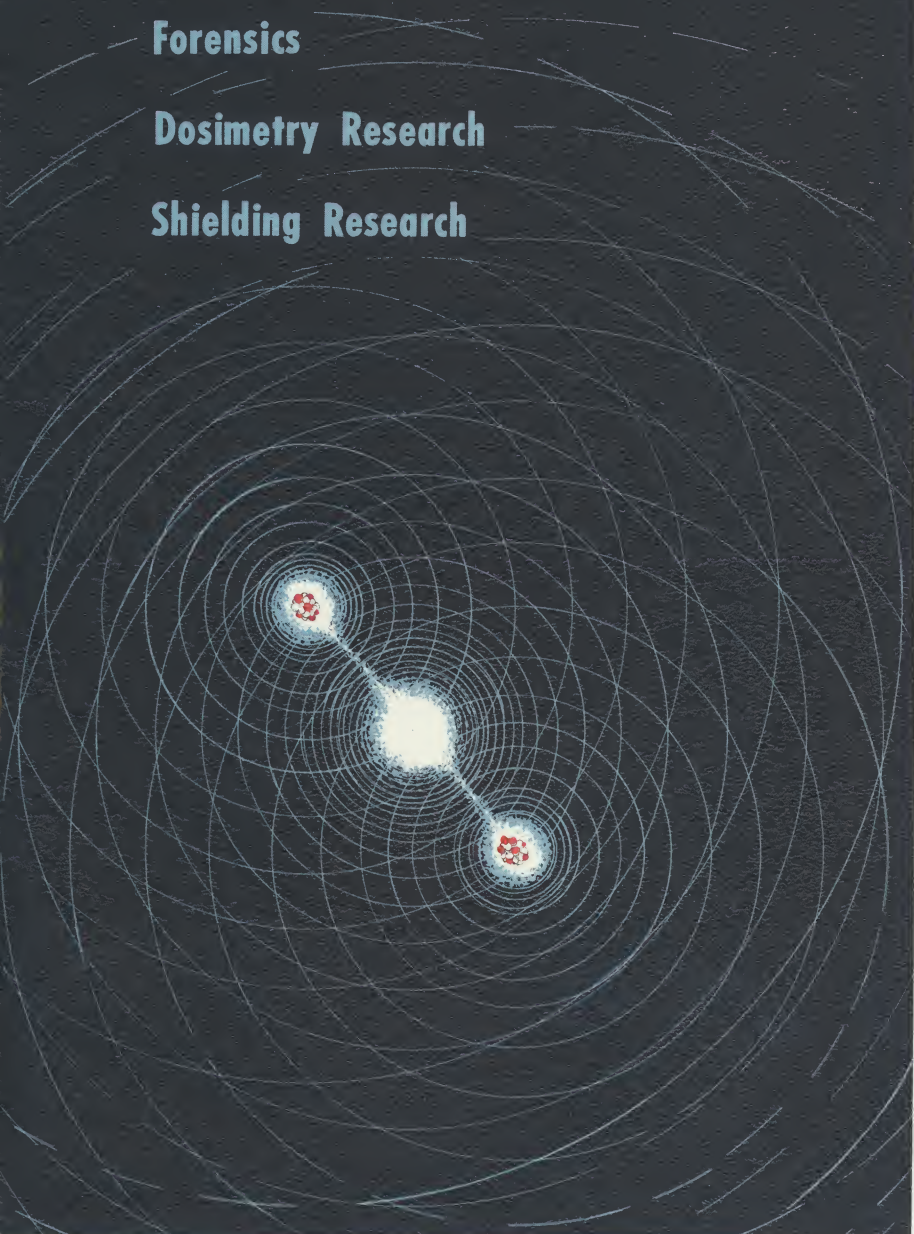
**Dosimetry Research**

**Shielding Research**

## **Air Force Nuclear Engineering Test Facility**

**AIR FORCE INSTITUTE OF TECHNOLOGY  
Air University**

**Wright-Patterson Air Force Base, Ohio**

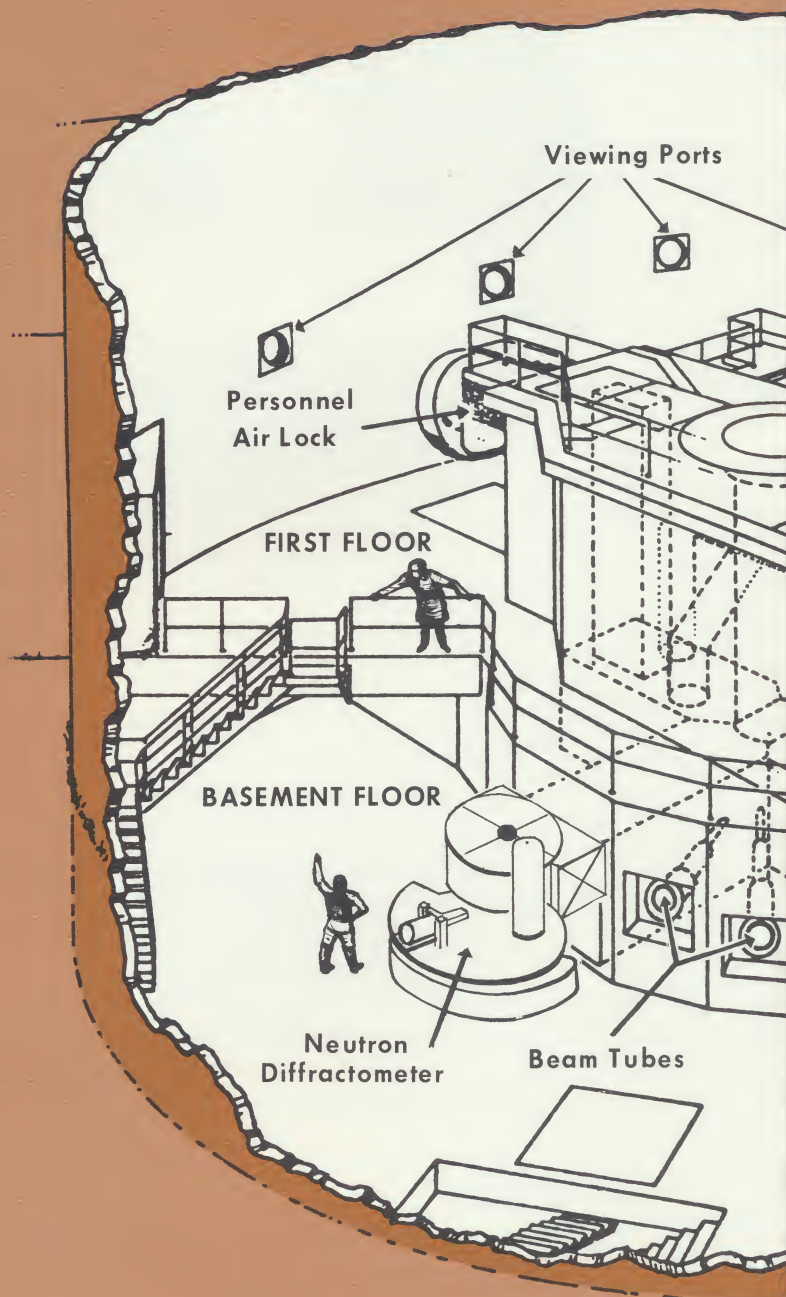




**Air Force Nuclear Engineering Test Facility**



## APPLICATIONS OF THE REACTOR

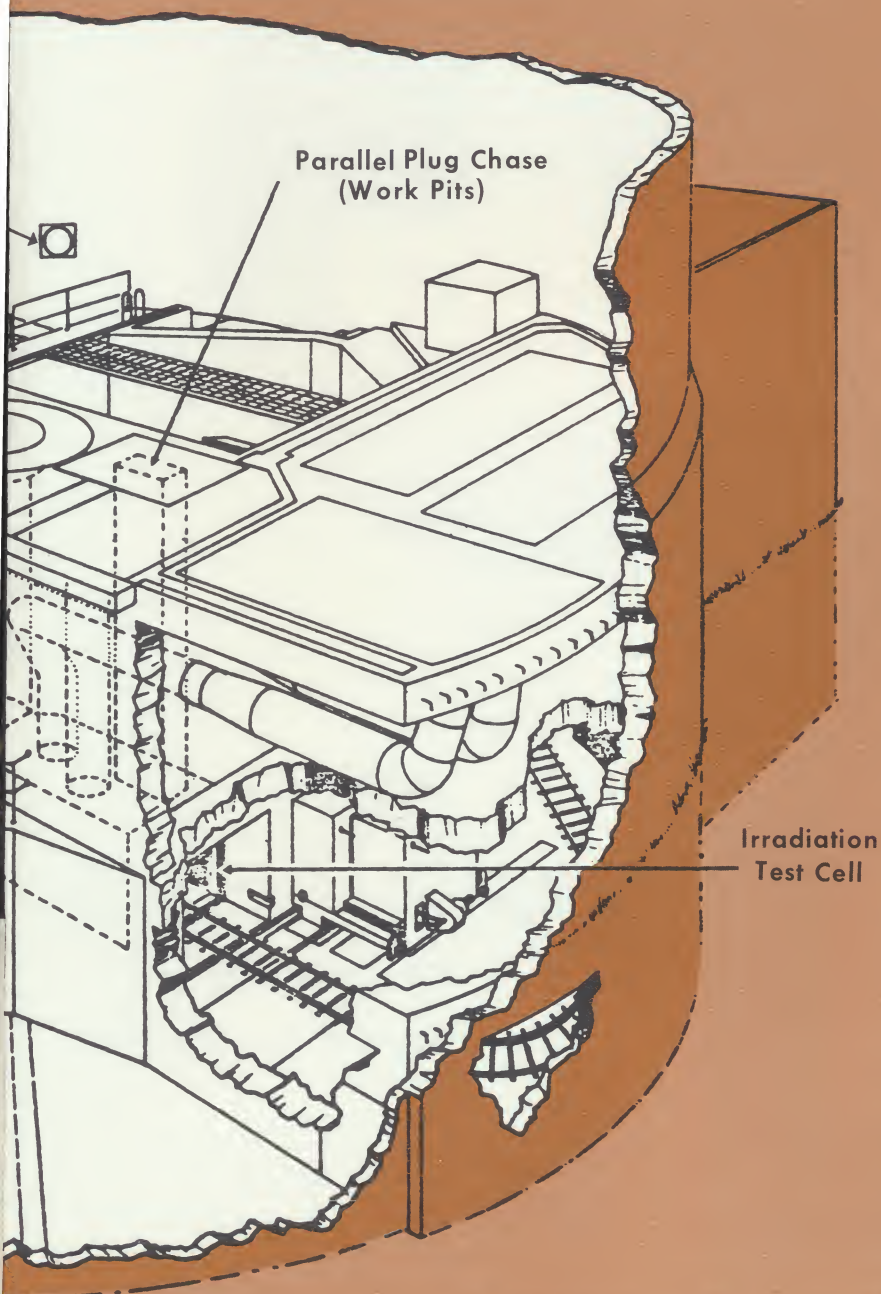


Through the employment of known technological applications and experimental techniques, the NETF can be used for investigating and solving an unlimited number of problems in the scientific and engineering disciplines. These include, but are not restricted to, biomedical research, nondestructive testing, material testing and development, solid-state and nuclear physics, molecular and crystalline structures, forensics and security, intelligence appraisal, bionics, electronics, molecular electronics, service engineering, industrial processes, radiochemistry, weapon effects and vulnerabilities, systems analysis, and aeronautics.

## A RESEARCH, DEVELOPMENT, AND TESTING TOOL

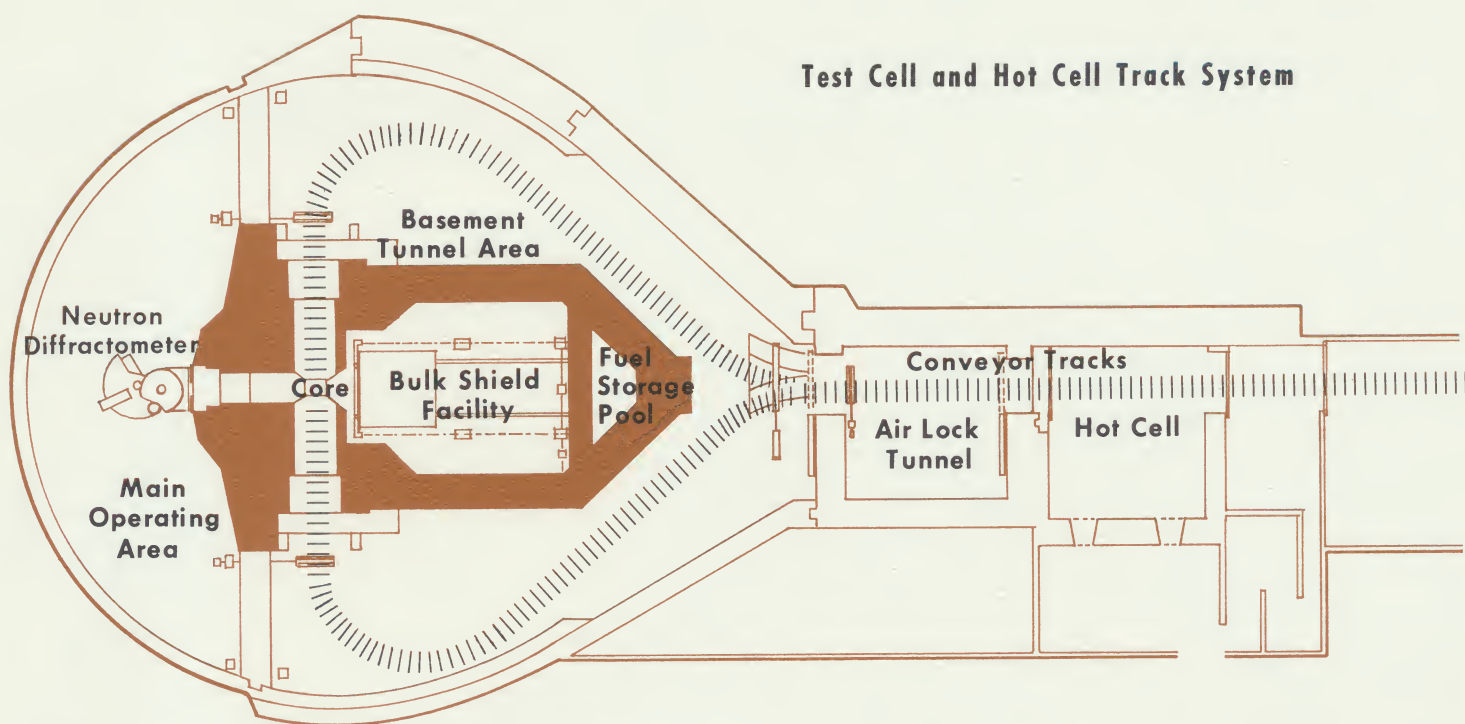
The Air Force Nuclear Engineering Test Facility (NETF), a recent acquisition of the Air Force Institute of Technology, is a research, development, and testing tool. It is an Air Force-directed and Department of Defense-supported project. It consists of a 10-megawatt reactor with all essential support facilities and equipment, and is the highest-powered steady-state reactor in the Department of Defense.

The NETF and the services of its staff are available to individuals or agencies of the Air Force or Department of Defense, to their contractors, and to universities conducting programs in fulfillment of known or anticipated Air Force requirements.



Cutaway drawing of NETF experimental facilities





**Test Cell and Hot Cell Track System**

### SUPPORTING EQUIPMENT

- A double-axial/tri-axial neutron diffractometer in horizontal beam tube #5.
- A Scientific Data Systems' 920 computer which can be used as a data-acquisition system.
- Counting facilities which include two single-channel analyzers with automatic sample changers, punch-paper tape and typewriter read-out capabilities; a 400-channel analyzer with punch-paper tape, typewriter, X-Y plotter, and magnetic tape read-out capabilities; a 128-channel analyzer with automatic print-out; an Ultrascaler with automatic sample changer and print-out; a  $4\pi$  proportional counter; three  $2\pi$  proportional counters; and a coincidence counting system with a resolving time of 50 nanoseconds.
- A 700-curie hot cell which consists of a 21' x 24' shielded remote-handling area, two viewing windows, one General Mills and four Model-8 manipulators, and a 10-ton overhead crane.
- A chemistry laboratory containing hot and cold hoods and other associated equipment.
- Electronic equipment, such as meters, oscilloscopes, pulse signal generators, recorders, tube checkers, a digital voltmeter, and a leak detector.
- Machine shop equipment, including milling machines, drill presses, lathes, bench grinders, hydraulic press, belt sander, power hacksaw, and a band saw.
- Office space for experimentalist.
- NBS calibrated gamma-ray point sources.
- A graphite-moderated standard pile containing a 5-curie Pu-Be neutron source of  $8.86 \times 10^6$  n/sec.
- A 1400-curie, fixed-source gamma standard irradiator.
- Electricity, water, air, vacuum, and drainage are available at each experimental facility.
- A test-assembly area.
- A track system with a remote-controlled locomotive for transporting experiments to and from the test cells and the hot cell.
- A 15,000-curie  $\text{Co}^{60}$  dry irradiation facility.





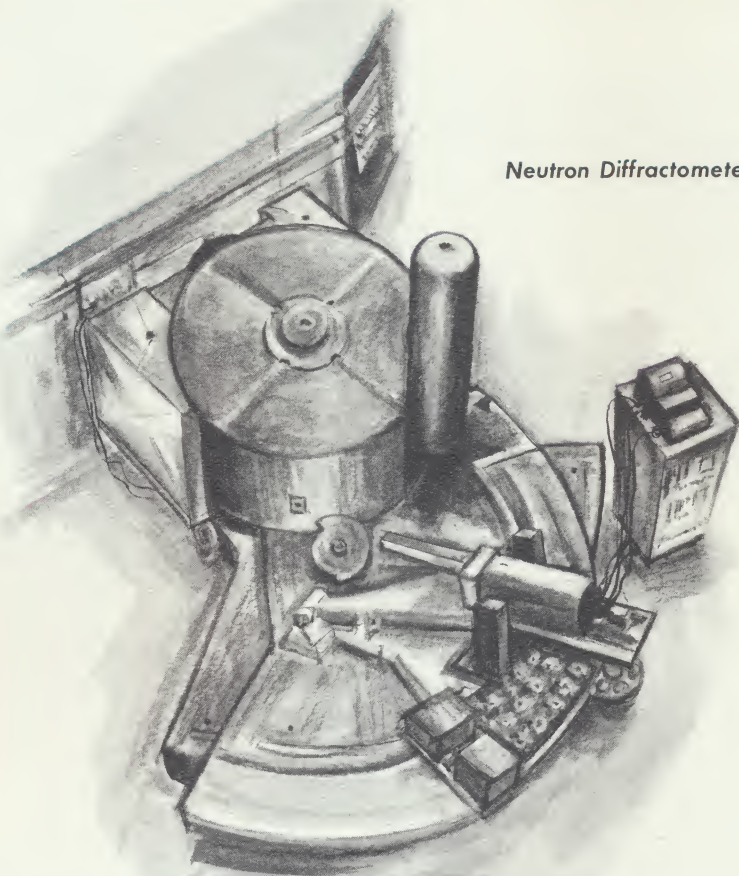
## SUPPORTING SERVICES

The services offered by the NETF staff in support of an experimental program include:

- Assistance with the engineering and hazards analysis of the experiment.
- Assistance in designing and fabricating the experimental apparatus.
- Insertion and removal of experiment.
- Operation of the hot cell.
- Health physics and experimental dosimetry.
- Disposal of experimental radioactive waste.
- Packaging of experimental radioactive material for shipping.

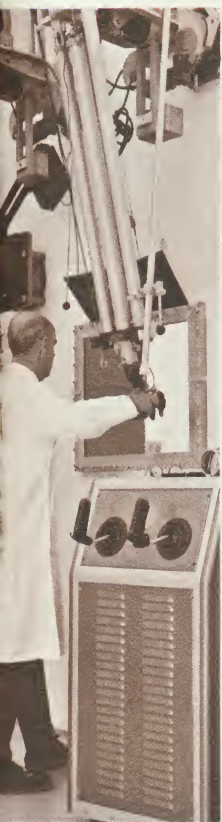
Additionally, members of the Air Force Institute of Technology (AFIT) School of Engineering faculty are available to the experimenter for consultation on special problems that arise during the planning and conducting of the experiment.

*Neutron Diffractometer*



◆ *Hot-cell operator at work using one pair of Model-8 manipulators*

*Health physicist operating the single-channel analyzers with automatic sample changers* ▼



Persons desiring to make arrangements for use of the NETF or to secure further information about the facility — its applications or experimental techniques — should address their inquiry to:

**Director  
Nuclear Engineering Test Facility  
Air Force Institute of Technology  
Wright-Patterson AFB, Ohio 45433**

**or call**

**255-5991 (Area Code 513).**

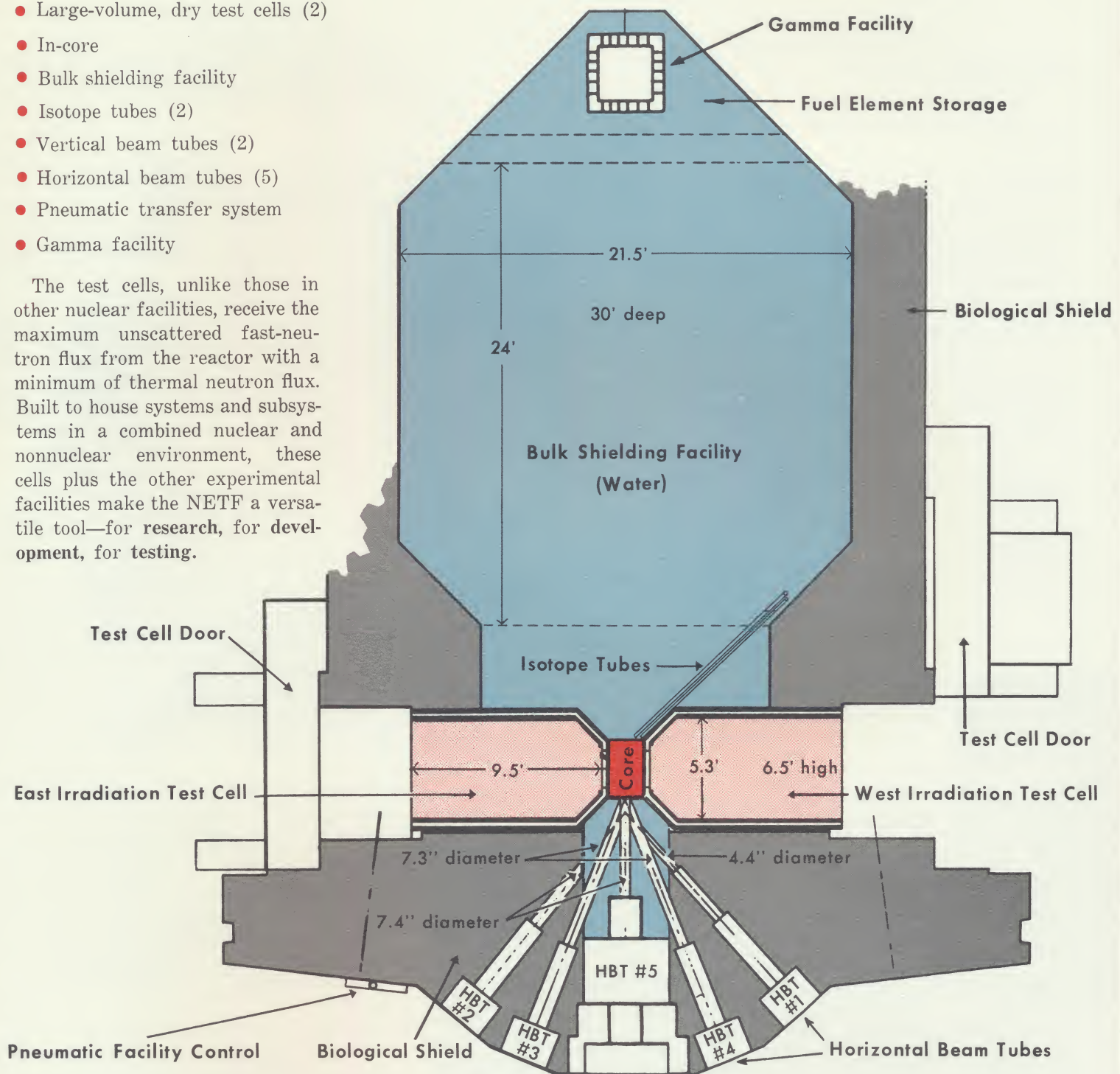
An informational film entitled "Air Force Nuclear Engineering Test Facility" (EC-12-66) is available for loan.



## EXPERIMENTAL FACILITIES

- Large-volume, dry test cells (2)
- In-core
- Bulk shielding facility
- Isotope tubes (2)
- Vertical beam tubes (2)
- Horizontal beam tubes (5)
- Pneumatic transfer system
- Gamma facility

The test cells, unlike those in other nuclear facilities, receive the maximum unscattered fast-neutron flux from the reactor with a minimum of thermal neutron flux. Built to house systems and subsystems in a combined nuclear and nonnuclear environment, these cells plus the other experimental facilities make the NETF a versatile tool—for research, for development, for testing.



AVAILABLE EXPERIMENTAL FLUXES

Location	Thermal $\phi < .4\text{ev}$ $\text{n/cm}^2 \text{ sec}$	Intermediate $.4\text{ev} < \phi < .1\text{Mev}$ $\text{n/cm}^2 \text{ sec}$	Fast $\phi > .1\text{Mev}$ $\text{n/cm}^2 \text{ sec}$	Gamma Dose Rate $\text{ergs/gmC hr}$	Facility Size
In-Core	$4.1 \times 10^{13}$	$1.0 \times 10^{14}$	$1.7 \times 10^{14}$	$5 \times 10^{10}$	15" x 21" x 24"
Test Cells	$1.38 \times 10^{12}$	$3.92 \times 10^{12}$	$4.49 \times 10^{12}$	$7.2 \times 10^9$	5.3' x 9.5' x 6.5'
Bulk Shielding Facility	$9.07 \times 10^{12}$	$2.6 \times 10^{12}$	$1.3 \times 10^{12}$	$5.4 \times 10^9$	21.5' x 24' x 30'
Isotope Tubes	$7.0 \times 10^{12}$	$2.6 \times 10^{12}$	$1.3 \times 10^{12}$	$5.4 \times 10^9$	4.0" x 1.5" ID
Horizontal Beam Tubes (at core face)	$8.88 \times 10^{12}$	$4.12 \times 10^{12}$	$2.06 \times 10^{12}$	$1.06 \times 10^9$	7.4" ID 7.3" ID 4.4" ID
Pneumatic Transfer System	$5.03 \times 10^{12}$		$1.14 \times 10^{12}$		4.5" x 1.5" ID
Gamma Facility				$2.9 \times 10^8$	12" x 12" x 24"



# The Atom Will Work For You!

Air Force In-house Research

Student Research

Government Research

Defense Contractors

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## AIR FORCE NUCLEAR ENGINEERING TEST FACILITY Wright-Patterson Air Force Base, Ohio



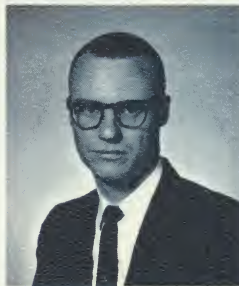
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Capt. D. M. Verrelli  
Assistant Director



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Engineering and Experimentation



G. R. Jenkins, Jr.  
Health Physicist



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